10-30-1968

Test 996: Ford 5000 Diesel 8-Speed (Also Ford 5000 Diesel 8-Speed Row Crop)

Tractor Museum
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NEBRASKA TRACTOR TEST 996 – FORD 5000 DIESEL 8-SPEED
(ALSO FORD 5000 DIESEL 8-SPEED ROW CROP)

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
67.23	2100	4.347	0.446	15.47	207	58	75	29.083
Standard Power Take-off Speed (540 rpm)—One Hour								
64.16	1901	3.994	0.429	16.06	208	58	75	29.080
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
60.05	2207	3.794	0.436	15.83	204	58	74	.....
0.00	2332	0.979	.....	.....	190	59	76	.....
31.02	2279	2.271	0.505	13.66	195	59	76	.....
67.65	2101	4.372	0.446	15.47	207	59	75	.....
15.63	2298	1.588	0.701	9.84	191	58	73	.....
45.90	2250	3.002	0.451	15.29	200	58	73	.....
Av 36.71	**2244**	**2.667**	**0.501**	**13.76**	**198**	**58**	**74**	**29.080**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Air wet bulb	Air dry bulb	Barom-eter inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
59.92	5344	4.20	2100	8.52	4.521	0.520	13.25	205	28	30	29.245
75% of Pull at Maximum Power—Ten Hours—4th Gear											
48.98	3950	4.65	2261	6.07	3.656	0.515	13.40	199	37	42	28.715
50% of Pull at Maximum Power—Two Hours—4th Gear											
34.78	2704	4.82	2304	4.39	2.896	0.574	12.01	202	29	31	29.235
MAXIMUM POWER WITH BALLAST											
36.13	7283	1.86	2300	11.69	2nd Gear			190	32	33	29.000
56.88	7118	3.00	2101	11.36	3rd Gear			194	32	33	29.000
58.75	5227	4.21	2100	8.23	4th Gear			205	34	38	29.135
60.16	4399	5.13	2102	6.97	5th Gear			206	34	36	29.150
59.54	3436	6.50	2101	5.43	6th Gear			205	32	35	29.160
54.57	1756	11.65	2098	3.19	7th Gear			205	32	35	29.160
MAXIMUM PULL WITHOUT BALLAST											
43.21	5167	3.14	2270	14.98	3rd Gear			195	39	46	28.700

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	5227	5560	5767	5918	5894	5768
Horsepower	58.75	55.68	51.10	45.66	39.13	31.81
Crankshaft speed rpm	2100	1890	1675	1465	1259	1044
Miles per hour	4.21	3.76	3.32	2.89	2.49	2.07
Slip of drivers, %	8.23	9.34	9.45	9.45	9.68	9.45

TIRES, BALLAST and WEIGHT		**With Ballast**	**Without Ballast**
Rear tires	—No, size, ply & psi	Two 16.9-30; 6; 16	Two 16.9-30; 6; 16
Ballast	—Liquid	787 lb each	None
	Cast iron	1008 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 4; 24	Two 7.50-16; 4; 20
Ballast	—Liquid	79 lb each	None
	Cast iron	74 lb each	None
Height of drawbar		22½ inches	24 inches
Static weight with operator—Rear		7340 lb	3750 lb
Front		2350 lb	2045 lb
Total		9690 lb	5795 lb

Department of Agricultural Engineering

Date of Test: October 30 to November 25, 1968

Manufacturer: FORD MOTOR COMPANY, FORD TRACTOR OPERATIONS, BIRMINGHAM, MICHIGAN

FUEL, OIL and TIME **Fuel** No 2 Diesel **Cetane No** 54.3 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8283 **Weight per gallon** 6.896 lb **Oil** SAE 10W **API service classification** MS DS **To motor** 1.868 gal **Drained from motor** 1.502 gal **Transmission lubricant** Ford oil ESN-M2C77-A or M-4864-A **Final-drive lubricant** Ford oil ESN-M2C53-A or M-2C53-B **Total time engine was operated** 55 hours.

ENGINE **Make** Ford Diesel **Type** 4 cylinder vertical **Serial No** E00 3963 **Crankshaft mounted** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.4" x 4.2" **Compression ratio** 16.5 to 1 **Displacement** 256 cu in **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** oil washed wire mesh **Oil filter** full flow replaceable cotton blend element **Fuel filter** one nylon gauze element in bottom of tank and dual replaceable paper elements with water traps **Muffler** was used **Cooling medium temperature control** Thermostat.

CHASSIS **Type** standard **Serial No** C209902 **Tread width** rear 52" to 80" front 52" to 80" **Wheel base** 87.5 **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 27.30" Vertical distance above roadway 32.95" Horizontal distance from center of rear wheel tread 0" to the right **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.5 second 2.0 third 3.5 fourth 4.7 fifth 5.6 sixth 7.0 seventh 12.4 eighth 16.8 reverse 2.3 and 8.1 **Clutch** single plate dry disc operated by foot pedal **Brakes** oil cooled multiple disc mechanically operated by two foot pedals which can be locked **Steering** mechanical with power assist **Turning radius** (on concrete surface with brake applied) right 117" left 117" (on concrete surface without brake) right 141" left 141" **Turning space diameter** (on concrete surface with brake applied) right 249" left 249" (on concrete surface without brake) right 294" left 294" **Belt pulley** 1072 rpm at 2050 engine rpm diam 11" face 6.5" **Belt speed** 3087 fpm **Power take-off** 540 rpm at 1900 engine rpm.

REPAIRS AND ADJUSTMENTS: During preliminary pto runs, all injectors were removed and checked. Injectors 1 and 3 were disassembled, cleaned and reinstalled and the test continued.

REMARKS: During the second gear run, oil was forced out of the range transmission shift lever mounting. First gear was not run as it was necessary to limit the pull in second gear because of the stability formula. Eighth gear was not run because it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 996.

L. F. LARSEN
Engineer-In-Charge

G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
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Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

FORD 5000 DIESEL 8-SPEED